
Characteristics and Referrals of Patients in a Comprehensive Eye Care Clinic

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TO DETERMINE DEMOGRAPHIC AND SOCIOECONOMIC characteristics of optometric patients and the rates of referrals for corrective lenses and specialized eye care services, a study was undertaken at the Optometric Center of New York during a 5-month period in 1973-74. This center, the clinical facility of the State College of Optometry, State University of New York, provides a full range of eye care services. In addition to a general optometry clinic, the center has special clinics for diagnosis and treatment of various visual defects and disorders and for groups such as infants. The rates of referrals for patients of this facility, as well as the level of care, undoubtedly differ from

those for other patient groups. However, by identifying referral patterns according to specific characteristics of the patients, it is possible to draw some inferences applicable to other groups with similar characteristics.

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Study Procedure

Data for the study were obtained from the examination records of all patients seen in the general optometry clinic of the optometric center from November 1973 through March 1974. Records for the previous day's patients were collected, and demographic, socio-economic, and clinical information was recorded on daily worksheets. The data were classified and analyzed at the end of the study period. It should be emphasized that the study group comprised all patients visiting the clinic during the study period, not a sample of the patients. Statistical reports from the center's billing system substantiated the completeness of the study group.

All patients are given appointments in the clinic at a specific time with a specific optometrist. A receptionist records the patient's age, sex, residence, and method of financing. Upon completion of the eye examination, the optometrist fills out a referral slip for each patient needing additional services. This slip, a copy of which is attached to the patient's examination record, describes the reason for referral and names the department or clinic to which the patient is referred. Patients are told the reason for the referral, what additional testing is needed, and whether an additional fee will be incurred. The referral rates reported in this study are based on the optometric diagnosis and the data on the referral slip. They indicate the percentages of patients who were advised by the examining optometrist of the need for corrective lenses or for additional consultation and further testing at a specialty clinic. The rates do not refer to the percentages of patients who actually followed the optometrist's advice.

The research procedure was as follows: (a) determination from the patients' records of the number of visits during the study period, (b) classification of patients by age, sex, residence, and method of pay-

ment, (c) determination of the number of new patients and the time interval since the last visit for previous patients, (d) determination of the number of referrals by type of service, and (e) classification of referrals by age of patient and method of financing.

Characteristics of Patients

A total of 4,156 patients were examined at the general optometric clinic during the study period. Of these, 64 percent were self-paying and 36 percent were Medicaid recipients. The percentages of self-paying and Medicaid patients according to their place of residence were as follows:

Borough	Percent self-paying	Percent Medicaid
Manhattan	60.3	39.7
Brooklyn	54.5	45.5
Queens	79.1	20.9
Bronx	56.0	44.0
Other	96.0	4.0

The distribution of the self-paying and Medicaid patients by place of residence shown in table 1 reveals more clearly the differences between the two groups. More than 40 percent of all Medicaid patients came from Brooklyn, compared with only 28 percent of all self-paying patients. The difference in age distribution of the Brooklyn patients in these groups largely accounts for this disparity:

Age group (years)	Self-paying patients		Medicaid patients	
	Number	Percent	Number	Percent
0-19	405	54.7	505	81.6
20-39	172	23.2	60	9.7
40-59	97	13.1	33	5.3
60 and over	66	9.0	21	3.4
Total	740	100.0	619	100.0

A possible reason for the relatively large percentage of Medicaid patients from Brooklyn may be a lack of services in disadvantaged areas of this borough combined with an awareness of the optometric center's comprehensive services. As a result of the center's participation in vision screening programs in schools and its contributions to health fairs, guidance counselors, teachers, and parent-teacher associations have become familiar with the services provided by this institution.

Although a valid assessment of the vision care delivery system in a community would require information on all types of providers, including optometrists, ophthalmologists, health centers, and clinics, a recent survey that I made of optometrists suggests a shortage of services in certain areas of Brooklyn. In this

Table 1. Distribution of patients seen in the general optometry clinic, by place of residence

Borough	Self-paying patients		Medicaid patients		All patients	
	Number	Percent	Number	Percent	Number	Percent
Manhattan ..	700	26.6	460	30.3	1,160	27.9
Brooklyn	740	28.0	619	40.7	1,359	32.7
Queens	382	14.5	300	19.7	682	16.4
Bronx	482	18.3	127	8.4	609	14.7
Other	332	12.6	14	0.7	346	8.3
Total ...	2,636	100.0	1,520	100.0	4,156	100.0

survey, based on listings in the Blue Book of Optometrists for 1972 (1), I found a great disparity in the ratio of optometrists to population among the various community planning districts of Brooklyn. Bedford Stuyvesant, a disadvantaged area, had 1 optometrist for every 43,000 persons, whereas Flatbush, a middle-class neighborhood, had 1 optometrist for every 6,000 persons. Furthermore, the Directory of Medical Specialists does not list any ophthalmologists practicing in Bedford Stuyvesant (2).

Residential data by themselves, however, may be misleading. Place of employment rather than area of residence may be the decisive variable for many patients. Furthermore, such factors as travel time, or even perceived travel time, availability and cost of transportation, and reputation of health care providers may be important in determining patients' use of health services. Thus, one must remain cautious in drawing any conclusions solely from residential data.

Age distributions of the patients of the general optometry clinic show that the Medicaid group is considerably younger than the self-paying group (table 2). Approximately 72 percent of the Medicaid recipients were under 20 years of age, compared with only 48 percent of the self-paying patients. Furthermore, 10 percent of all self-paying patients were over 60 years of age, whereas only 6 percent of the Medicaid patients were in that age category.

The percentages of young patients were probably higher in both the self-paying and Medicaid groups than is typical of a general optometric practice. A study of the age distribution of patients of 92 practicing optometrists in New York State found only 26 percent under age 20; 45 percent were under 50

Table 3. Percentage distribution of patients seen in the general optometry clinic, by sex and age group

Age group (years)	Self-paying patients		Medicaid patients		All patients	
	Male	Female	Male	Female	Male	Female
0-5	52	48	53	47	52	48
6-9	61	39	56	44	58	42
10-19	57	43	55	45	56	44
20-29	44	56	27	73	41	59
30-39	36	64	38	62	35	65
40-49	43	57	29	71	39	61
50-59	30	70	41	59	32	68
60-69	33	67	24	76	31	69
70 and older	39	61	46	54	41	59
All ages	48	52	49	51	48	52

years of age, and 18 percent were 60 years or older (3).

Differences in the male-female percentages between the self-paying and Medicaid patients of the clinic were found for specific age groups (table 3). These differences are most apparent in the 20-29 and 40-49 age categories. In the younger age groups, the percentages of males are considerably higher than the percentages of females for both self-paying and Medicaid patients. This finding is somewhat surprising, since in the general population the percentage of females using corrective lenses is higher than the percentage of males in all age groups (4).

Previous Clinic Visits

An important measure of use of health services is continuity, or the time interval since a patient's previous visit. Rather than relying on patients' recol-

Table 2. Age distribution of patients seen in the general optometry clinic

Age group (years)	Self-paying patients			Medicaid patients			All patients		
	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent
0-5	99	3.7	...	90	5.9	...	189	4.5	...
6-9	530	20.1	23.8	503	33.1	39.2	1,033	24.9	29.4
10-19	640	24.3	48.1	500	32.9	71.9	1,140	27.4	56.8
20-29	373	14.2	62.3	94	6.2	78.1	467	11.2	68.0
30-39	240	9.1	71.4	97	6.3	84.4	337	8.1	76.1
40-49	256	9.7	81.1	89	5.9	90.3	345	8.3	84.4
50-59	235	8.9	90.0	57	3.8	94.1	292	7.0	91.4
60-69	171	6.5	96.5	40	2.6	96.7	211	5.1	96.5
70 and older	92	3.5	100.0	50	3.3	100.0	142	3.5	100.0
Total	2,636	100.0	100.0	1,520	100.0	100.0	4,156	100.0	100.0

lections of when or from whom they had last received an eye examination, I measured and substantiated prior use on the basis of the patients' previous visits to the optometric center. This procedure also enabled me to determine the percentage of patients visiting the center for the first time.

Interestingly, as shown in the following tabulation, the percentages of new patients were about the same

for the two method-of-payment groups:

Patient status	Self-paying patients		Medicaid patients	
	Number	Percent	Number	Percent
New patients	1,724	65.4	1,009	66.4
Returning patients	912	34.6	511	33.6
Total	2,636	100.0	1,520	100.0

Table 4. Percentage distribution of patients seen in the general optometry clinic, by type of referral according to age group

Age and financing groups	Corrective lenses ¹	Vision training	Pathology	Contact lenses	Other specialty clinics ²	All services ³
0-5 years						
Self-paying (N=99)	27.3	16.2	7.0	0.0	17.2	62.6
Medicaid (N=90)	38.9	15.6	6.7	1.1	22.2	65.1
All patients (N=189)	32.8	15.8	6.8	0.5	19.5	65.1
6-9 years						
Self-paying (N=530)	36.2	38.3	2.3	0.4	0.8	74.1
Medicaid (N=503)	50.7	29.0	4.2	0.6	1.4	76.4
All patients (N=1033)	43.3	33.8	3.2	0.5	1.0	75.2
10-19 years						
Self-paying (N=640)	53.1	25.1	2.9	2.6	0.4	75.5
Medicaid (N=500)	4 59.9	29.4	4.1	2.1	1.6	4 86.4
All patients (N=1140)	55.9	26.9	3.4	2.3	0.9	80.2
20-29 years						
Self-paying (N=373)	59.3	7.8	3.0	8.9	1.3	77.7
Medicaid (N=94)	64.9	13.8	4 8.5	4.3	0.0	79.8
All patients (N=468)	60.2	9.0	4.1	7.9	1.1	78.2
30-39 years						
Self-paying (N=240)	60.4	5.4	9.2	5.0	1.7	72.9
Medicaid (N=97)	53.6	8.2	4 18.6	2.1	1.0	76.3
All patients (N=337)	58.4	6.2	11.9	4.2	1.5	73.9
40-49 years						
Self-paying (N=256)	75.8	1.2	7.0	0.7	2.7	81.6
Medicaid (N=89)	4 86.5	1.1	11.2	2.2	7.8	4 93.3
All patients (N=345)	78.6	1.1	8.1	1.2	4.1	84.6
50-59 years						
Self-paying (N=235)	77.4	1.3	6.8	0.4	2.6	83.8
Medicaid (N=57)	73.7	0.0	4 17.5	0.0	5.3	86.0
All patients (N=292)	76.7	1.0	8.9	0.3	3.1	84.3
60-69 years						
Self-paying (N=171)	62.0	0.0	19.3	1.2	4.1	80.1
Medicaid (N=40)	60.0	0.0	22.5	2.5	2.5	80.0
All patients (N=211)	61.6	0.0	19.9	1.4	3.8	80.1
70 years and over						
Self-paying (N=92)	50.0	0.0	23.9	3.2	8.7	77.2
Medicaid (N=50)	78.0	0.0	30.0	6.0	8.0	86.0
All patients (N=142)	59.9	0.0	26.1	4.2	8.5	80.3
All ages						
Self-paying (N=2,636)	55.1	16.2	6.0	2.7	2.3	76.8
Medicaid (N=1,520)	58.7	21.6	7.8	1.7	3.9	80.4
All patients (N=4,156)	56.4	18.2	6.7	2.4	2.7	78.2

¹ Includes both new prescriptions and changes in prescriptions. Does not include referrals for contact lenses.

² Includes infants' vision, low vision, visual fields, tonometry, aniseikonia, and vision-evoked response clinics.

³ The percentages in this column are less than the sum of the other columns because some patients were referred to more than one service.

⁴ Statistically significant at 0.05 level by chi-square test.

Among the returning patients, the two groups did differ, however, as to the time interval between their previous visit and their current examination. Medicaid patients were more likely to return for yearly examinations than the self-paying patients. This difference may be due to the higher percentage of young people in the Medicaid group. The percentage distributions by time interval were:

<i>Time-interval</i> (years)	<i>Self-paying</i> <i>patients</i> (<i>N</i> = 912)	<i>Medicaid</i> <i>patients</i> (<i>N</i> = 511)
Less than 1	27	42
1 to 2	43	43
2 to 3	14	11
3 or more	16	3

Referral Rates

A total of 3,249 patients were referred for corrective lenses or specialized services, some of them for more than one service. The percentages for each age group, method-of-payment category, and type of service are shown in table 4. Data by sex are not presented because referral patterns were not found to differ substantially for this characteristic. Although some minor differences were noted, the sample sizes were too small to allow for statistical significance tests. Variations according to sex of the patients may, however, prove fruitful for future studies.

Corrective lenses. For patients under 20 years and those over 70, major differences occurred in the rates of referrals for corrective lenses between the self-paying and Medicaid groups. In the age group 6-9 years, more than 50 percent of the Medicaid patients needed corrective lenses, compared with only 36 percent of the self-paying group. Additional research is

needed to determine whether the differences reflect physiological effects of poverty or the previously unmet need of an indigent population.

A substantial increase in the need for corrective lenses by both self-paying and Medicaid patients in their forties reflects the physiological changes, particularly the onset of presbyopia, that occur with increased age.

The high referral rates for school-aged children underscore the importance of vision examinations for this segment of the population, although these rates are not applicable to the general population. Patients seeking optometric examinations are, of course, a select group, particularly among school-children. Preselection by teachers and guidance counselors helps to identify those children with visual disorders.

Data on referrals for corrective lenses according to whether or not the patient was wearing lenses before the examination were obtained for 3,139 of the patients seen during the study period. The percentage of Medicaid patients without a previous prescription who needed a prescription was somewhat higher than the percentage of the self-paying patients, 44.3 percent compared with 41.2 percent (table 5). Moreover, among the patients already wearing corrective lenses when they were examined at the clinic, the percentages of those needing a change in prescriptions were 65 for the Medicaid group and about 59 for the self-paying patients. Of all patients who had a previous prescription, almost 61 percent needed a change in their prescription, and of all patients without a previous one, 43 percent were given a prescription for the first time.

The percentages of clinic patients needing correc-

Table 5. Changes in prescription status for patients of the general optometry clinic, by method of financing

<i>Prescription status</i>	<i>Self-paying patients</i>		<i>Medicaid patients</i>		<i>All patients</i>	
	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>
Patients without previous prescriptions ¹	691	100.0	481	100.0	1,172	100.0
Needing prescription	285	41.2	213	44.3	498	42.5
Not needing prescription	406	58.8	268	55.7	674	57.5
Patients with previous prescriptions ²	1,322	100.0	645	100.0	1,967	100.0
Change	778	58.9	419	65.0	1,197	60.9
No change	544	41.1	226	35.0	770	39.1

¹ Not statistically significant. ² $\chi^2 = 6.79$; $df = 1$; $P < 0.05$.

tive lenses seem high and may well reflect a significant unmet need for optometric services. Data from the National Health Examination Survey on the adequacy of corrective lenses in the general population indicate that many people are wearing corrective lenses that do not improve their vision (5). Among persons aged 18 through 79 years, 44 percent had corrective lenses for distance vision. Of these, corrective lenses improved acuity for 76 percent, but 19 percent tested the same with their glasses as without, and 5 percent did better without their glasses. These data indicate that their current prescription was no longer appropriate for 24 percent of the persons examined for correction for distance vision. Fifty-two percent of this same sample had corrective lenses for near vision. The lenses improved acuity for 83 percent of the sample, 14 percent tested the same, and 3 percent had decreased acuity with their glasses.

Pathology clinic. The percentages of patients referred for ophthalmological consultation ranged from 2.3 for the 6–9 age group among the self-paying patients to 30.0 for the Medicaid patients 70 years and older (table 4). In both groups an unusually high proportion of children under 6 years were referred to the pathology clinic, but many of these children were not referred for pathological conditions. Rather, they were referred for cycloplegic examination and refraction, because of the difficulty of obtaining accurate findings for this group by optometric examination.

There were differences between the self-paying and Medicaid groups in almost all age categories. Significant differences occurred in the 20–29, 30–39, and 50–59 age groups. Differences between the method-of-payment groups are also evident, although not significant, for patients aged 6 through 19 years. The magnitude of these differences raises the question of what effects poverty has on health. Studies are needed to determine whether these differences may be associated with physiological effects of social, economic, and environmental factors.

The rates of referrals to the pathology clinic in this study may be compared with the findings of three other studies. Eisenberg and colleagues reported a referral rate of 12 percent to ophthalmological consultation for members and dependents of a union eye care program (6). In a study by Griffin and Lukerman, 2.75 percent of all patients seen in a prepaid health center were referred to the ophthalmologist (7). Greenlick and associates studied the use of medical care services by the general mem-

bership and the medically indigent within a prepaid group practice program. Diseases of the eye accounted for 4.2 percent of all ambulatory medical care services (8).

It is doubtful that the rates of referrals to the pathology clinic of the optometric center are applicable to the general population. However, the data indicate that patients are motivated to seek optometric services by the presence, or presumed presence, of symptoms of visual disorders.

Contact lens clinic. The reasons for referral to the contact lens clinic differed for the self-paying and Medicaid patients. Self-paying patients were referred for either cosmetic or noncosmetic purposes, but Medicaid patients, only for noncosmetic reasons. The Medicaid program in New York City does not pay for cosmetic contact lenses. The high referral rate for the self-paying patients aged 20–39 years undoubtedly reflects the desire of many patients for cosmetic contact lenses (table 4).

The referral rates for the Medicaid patients are of particular interest, since they represent patients for whom contact lenses are considered visually necessary—for aphakia or keratoconus, for instance. The relationship between the use of contact lenses and socioeconomic variables needs further study.

An interesting trend may be noted in the treatment of visual defects of the aged. A greater proportion of patients aged 60 years or older were referred for contact lenses than those aged 40–59 years. The older patients included many with aphakia. For such persons, particularly those with unilateral aphakia, contact lenses can provide much better vision than can spectacles.

Other special clinics. Referrals were also made to clinics dealing with infants' vision, low vision, visual fields, tonometry, aniseikonia, or vision-evoked response. The high rates for children under 6 years of age reflect the referrals to the infants' vision clinic, where special services are available for patients aged 3 months to 3 years (table 4). Differences in referral rates to the speciality clinics between self-paying patients and Medicaid patients are most apparent for those in the 40–50 age group.

Clinic Factors Affecting Referrals

The referral patterns observed in this study may have been influenced by characteristics of the optometric center itself. Particularly important is the fact that the center is a comprehensive eye care clinic, providing specialty services for patients re-

quiring vision training, contact lenses, or aids for subnormal vision, as well as ophthalmological care. The optometrist is responsible not only for informing the patient of the need for additional consultation and further testing but also for communicating directly with the specialty clinic about the referral. This direct access to specialty services undoubtedly affects the practitioner's behavior in referring and motivating patients to seek the necessary care.

Another important consideration is the method by which the clinic staff members are remunerated for their services. They receive a salary, rather than a fee-for-service or capitation payment. The fee-for-service system may strongly influence decisions of the practitioner. The professional in private practice, for example, may be reluctant to refer a patient, since referral may mean the loss of the patient. In a group practice in which the members are paid on a fee-for-service basis, economic pressures may encourage "ping-ponging" of patients and hence overreferral. A capitation system, on the other hand, may encourage underreferral of patients, since control of use, and hence costs, benefits the providers of care. A salary system does not offer inducement for either overreferral or underreferral of patients, since the practitioner is paid the same regardless of the number of services he provides.

The method by which the patient pays for services may also affect decisions of the health provider. Most practitioners will not be deterred by financial considerations from doing what is best for their patients. If additional testing is debatable, however, the economic cost to the patient may influence the practitioner's decision to refer. Under such circumstances, the practitioner may be less reluctant to refer patients covered by third-party payment plans, such as Medicaid, than patients who must pay the costs directly. No evidence to support this hypothesis was found in this study.

Although it is recognized that referral patterns are affected by characteristics and traits of individual practitioners, as well as modes of health care delivery, it was not possible to take these factors into account in this study. Rather, the study was focused on the effects of patient characteristics on use of eye care services.

Conclusions

Comparison of the patterns of use of eye care services for self-paying and Medicaid patients in this study has shown similarities as well as meaningful differences. Age-specific rates for referrals for corrective lenses and for pathological consultation were

significantly higher for Medicaid patients than for self-paying patients in certain age groups. Such differences suggest that social, environmental, and psychological factors related to poverty may play a determining role in possible physiological differences between the two groups. Findings and conclusions from this study, however, must be tentative, since the study group was a clinic population and the clinic was a teaching facility.

Further research is needed to provide baseline data on incidence and prevalence of visual disorders and to evaluate the effects of social, economic, and demographic characteristics on use of eye care services. Realistic statistics on utilization rates and referral patterns are crucial in establishing new health facilities and operating existing ones. Such statistics are essential in planning and staffing optometric clinics. They are also important in evaluating the performance of health care practitioners.

In this study, 30 percent of the patients given a general optometric examination needed additional testing and specialized services. The implication of this finding for the organization of eye care services is clear. In a group practice environment that provides comprehensive eye care, such services are readily available to patients. The availability of these services increases the likelihood of proper referral by the examining optometrist and of the patient's following his advice.

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